

# Registration of 'N7002' Soybean

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'N7002' soybean [*Glycine max* (L.) Merr.] (Reg. No. CV-492, PI 647085) was cooperatively developed and released by the USDA-ARS and the North Carolina Agricultural Research Service. It is a determinate group VII maturity soybean cultivar that has excellent yield potential. Twenty-five percent of its parentage is exotic germplasm. Few soybean cultivars produced in the USA have this level of genetic diversity, and thus, its release broadens the genetic base of soybean cultivars. N7002 is adapted to the southern USA (30° to 37° N latitude) or wherever cultivars of group VII maturity are produced.

N7002 is an  $F_4$ -derived selection from the cross of 'N7001' and 'Cook' (Carter et al., 2003; Boerma et al., 1992). N7001 was the first public cultivar released in the USA with Plant Introduction (PI) 416937 in its pedigree (USDA-ARS National Genetic Resources Program, 2005). The PI 416937, a landrace from Japan, appears distinctly different from the previous ancestors of North American soybean, with much larger leaves and a more prolific rooting system (Pantalone et al., 1996 a,b). Cook was derived from the cross of 'Braxton' and 'Young' (Bernard et al., 1988; Burton et al., 1987). The  $F_1$  hybrid seed from the cross were produced in 1994 at Clayton, NC, and  $F_1$  plants were grown during the following winter at the USDA-ARS Tropical Agriculture Research Station (TARS), Isabela, PR. The  $F_2$  and  $F_3$  generations were advanced using the single seed descent breeding method (Brim, 1966). The  $F_2$  generation was advanced at Clayton, NC, in 1995 followed by the  $F_3$  generation at TARS during the winter. In 1996 individual  $F_4$  plants were grown and harvested at Jackson Springs, NC. Approximately 173  $F_4$  plants were grown in progeny rows at Clayton in 1997. Approximately 100 of these progeny rows were entered into replicated yield trials in North Carolina during 1998. The bulked harvest of progeny row N97-9658 was designated N7002. N7002 is a full sib of USDA maturity group VIII cultivar N8001 (Carter et al., 2007).

Between 2002 and 2005, N7002 was evaluated in 14 environments of the North Carolina State University Official Variety Trials (Bowman, 2005). N7002 matured 1 d earlier than N7001 and 3 d earlier than USDA cultivar NC-Raleigh (Burton et al., 2006). The plant height of N7002 was 8 cm taller than N7001 (91 cm) and 6 cm taller than NC-Raleigh (93 cm). Plant lodging was rated using a scale of 1 to 5, where 1 = no lodging and 5 = completely lodged at maturity. The plant lodging of N7002 (1.9) was very similar to that of N7001 (1.8) and less than that of NC-Raleigh (2.3). Yield of N7002 (2907 kg ha<sup>-1</sup>) was similar to that of NC-Raleigh (2937 kg ha<sup>-1</sup>) and 17% greater than that of N7001 (2491 kg ha<sup>-1</sup>).

N7002 was evaluated in 56 environments in the USDA-ARS Southern Region Uniform Group VII Tests during 2000 to 2005 (Paris and Shelton, 2005). The group VII maturity cultivars 'Benning' and 'Haskell' have been the standard control cultivars for this test since 1996 and 1993, respectively (Boerma et al., 1994, 1997). In 2004 Haskell was replaced by 'HaskellRR' as a control cultivar in the USDA-ARS Southern Region Uniform Group VII Test. HaskellRR is a backcross-derived cultivar that has the patented Roundup Ready trait and is virtually identical to Haskell for yield and all other agronomic traits in the absence of Roundup herbicide (Monsanto, Marysville, OH) (H.R. Boerma, personal communication, 2005). To describe the agronomic performance of N7002 in comparison to control cultivars for 2000–2005, the performances of Haskell and HaskellRR were merged and designated 'Haskell/HaskellRR'. Maturity of N7002 was similar to that of Haskell/HaskellRR and 3 d later than Benning. The plant height of N7002 (84 cm) was shorter than Benning (88 cm) and Haskell/HaskellRR (89 cm). N7002 lodged less (1.9) than Haskell/HaskellRR (2.5) but was similar in lodging with Benning (2.1). The seed yield of N7002 (3223 kg ha<sup>-1</sup>) was greater than that of Benning (2977 kg ha<sup>-1</sup>) and Haskell/HaskellRR (2999 kg ha<sup>-1</sup>). The 100-seed weight of N7002 (13.1 g) was smaller than that of Benning (14.7 g) and Haskell/HaskellRR (15.0 g). Seed protein content of N7002 averaged 407 g kg<sup>-1</sup> on a zero moisture basis, which was higher than Haskell/HaskellRR (398 g kg<sup>-1</sup>) but similar to Benning (402 g kg<sup>-1</sup>). N7002 had less seed oil content (197 g kg<sup>-1</sup>) than Benning (204 g kg<sup>-1</sup>) and was similar to that of Haskell/HaskellRR (199 g kg<sup>-1</sup>).

N7002 has purple flowers, gray pubescence, tan pod wall color at maturity, and shiny yellow seed with imperfect black hila. In USDA regional tests, N7002 was rated resistant to *Soybean mosaic virus* and peanut root-knot nematode [*Meloidogyne arenaria* (Neal) Chitwood]. N7002 was rated susceptible to stem canker (caused by *Diaporthe phaseolorum* (Cooke and Ellis) Sacc. var. *meridionales* F.A. Fernandez), soybean cyst nematode

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(*Heterodera glycines* Ichinohe), and southern root-knot nematode [*M. incognita* (Kofoed & White) Chitwood]. In USDA trials in North Carolina, N7002 was rated resistant to frogeye leaf spot (caused by *Cercospora sojina* K. Hara) and bacterial pustule [*Xanthomonas campestris* pv. *glycines* (Nakano) Dye]. Field observations in North Carolina indicate that N7002 also resisted pod shattering after maturity, even with extensively delayed harvest.

Small seed quantities of N7002 will be available for research purposes from the corresponding author. It is requested that appropriate recognition be made if N7002 contributes to the development of a new germplasm line or cultivar. Seed will also be deposited in the National Center for Genetic Resources Preservation and National Plant Germplasm System.

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